APPENDIX H
CONTINGENCY SUBSURFACE WATER DETECTION

1. **Requirement.** Adequate water supply is a fundamental requirement for any military operation. Water is critical to both the care and health of soldiers and maintenance of equipment for continued generation of combat power. Both potable and non-potable water are required to initiate and sustain combat operations. Any significant military operation requires the acquisition of water from within the area of operations. Often surface water is not sufficient to support military operations, either because there is not enough of it or it is needed to support the local economy. Subsurface water is a valuable source of water for military operations. Military well drilling operations (whether by troop units or contractor) can tap into that vital source of water for US operations.

2. **Water Detection Response Team (WDRT).** Locating subsurface water in adequate quantities and within drilling capability is a highly developed and specialized science. The US Army Topographic Engineering Center's Terrain Analysis Center (TAC) and US Army Engineer Waterways Experiment Station (WES) have combined their expertise to form the WDRT. The WDRT is an on-call rapid response team ready to assist military terrain and well-drilling teams locate adequate subsurface water supplies. The team consists of US Government scientists and engineers who keep abreast of the latest developments in remote sensing, data acquisition, ground water resource data, geophysical techniques, equipment, field procedures, and drilling and well-completion innovations.

a. The WDRT consists of four elements: Data Base, Remote Sensing, Geophysics, and Supporting Specialists. TAC is responsible for team management.

(1) Data Base. TAC maintains a worldwide data base of available water supply and hydrologic data. These data are derived from the Army Central Terrain Intelligence File and the DOD Water Resources Data Base, as well as other data bases on water supply. When specific missions/requests are received for areas whose data are uncertain or inconclusive, the team will research additional literature and data unique to the area.

(2) Remote Sensing. If data bases and other supplemental information are inadequate, aerial or satellite imagery will be studied and analyzed for indications of ground water.

(3) Geophysics. Should local site investigation be necessary, the geophysicists from WES conduct electrical resistivity, seismic refraction, or other on site tests to define the subsurface over a local area in terms of geologic structure.

(4) Supporting Specialists. Supporting Specialists conduct field reconnaissance and contact host nation ground water experts to evaluate existing or abandoned water wells, conduct hydrogeologic reconnaissance of specific areas, and assist with interpreting well cuttings and down-hole electric logging.

b. Mission. Successful development of subsurface water is a combination of science, engineering, and art. Subsurface water quality, quantity, and location (depth) vary even within local areas depending on the strata level(s) in which it is found. It can range from highly saline to high mineral content to pure. The objective is to identify the high-potential areas for the best quality of water within the drilling capability available (troop or contract) to meet water production requirements.

c. Concept of Operations. The WDRT does not necessarily have to deploy to provide technical support for military operations. If activated, the WDRT's first effort at identifying high-potential areas will be the examination of existing data bases, textural information, and in-house experience. If high-potential water sources cannot be identified from source data and imagery, teams from the geophysics and/or Supporting Specialists elements can be deployed for on-site investigations. This process should take place prior to arrival of the well drillers.

3. In the theater of operations, the WDRT operates as a component of the USACE commander in theater. As with any USACE capability, activation of the WDRT is not automatic; it must be requested through the supporting USACE commander in theater. The USACE commander provides/arranges for the WDRT logistics and administrative support necessary for mission accomplishment.